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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON

Technical News Bulletin No. 50.

June 7, 1921.

GENERAL NOTE.

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1. Fourteenth Annual Conference on Weights and Measures

The Fourteenth Annual Conference on Weights and Measures was held at the Bureau of Standards on May 23 - 26. Invitations had previously been sent to the governors of states, mayors of various cities, and weights and measures officials throughout the country. The governors of those states which do not maintain an office of weights and measures were in every case urged to appoint delegates to the conference and many took advantage of this opportunity to send a representative to the Bureau. Manufacturers of apparatus and persons engaged in weights and measures work for industrial concerns, associations, etc., were also present. Several of the manufacturers had on exhibition various weights and measures appliances, including liquid measuring pumps, machines for automatically measuring the yardage of cloth, scales of all sorts, etc.

The main object of these conferences is to secure uniformity in weights and measures standards and laws and in the enforcement of the latter. Only fundamental questions of weights and measures are considered; the aim of the conference being rather to

direct the general subject than to go too much into detail. Among the speakers were: Mr. Herbert Hoover, Secretary of Commerce; Dr. S. W. Stratton, Director of the Bureau of Standards, and numerous officials of State Weights and Measures Departments. The subjects treated included the sale of bread by weight, detection of shortages, weighing of coal, and tests of liquid measuring pumps.

2. Conference on Aeronautical Safety Code

On May 13, a conference was held in Washington to consider the development of an Aeronautical Safety Code for which the Bureau of Standards and the Society of Automotive Engineers have been designated as the joint sponsors by the American Engineering Standards Committee. This conference was attended by representatives of the War, Navy, and Post Office Departments, The National Advisory Committee for Aeronautics, The National Safety Council, Manufacturers' Aircraft Association, and the Insurance Underwriters, as well as representatives of the two sponsors and the American Engineering Standards Committee.

It was the sense of this conference that a safety code ought to be developed without delay and that a committee should at once be formed which would include representatives of all organizations interested in this subject as well as those which were present at the conference. Invitations have, consequently, been extended to other interested organizations.

3. Standard Tests for Automobile Brake Linings

At a conference recently concluded at the Bureau of Standards, recommendations were made for a standard method of testing brake lining materials for automotive purposes; the engineers of the Bureau discussed these recommendations with representatives of nearly all the manufacturers of this class of material, as well as of the Motor Transport Corps of the Army and the Standards Committee of the Society of Automotive Engineers.

In view of the very large quantities of brake lining material used in automotive vehicles today, the establishment of standard test conditions which may be used by all makers and large users and which can form the basis for purchase specifications is of considerable importance, not only to the industry but also to the public. Such standards carefully planned tend to bring about a greater uniformity of the materials concerned,

and by establishing a better understanding of the essentials leave the manufacturer free from unnecessary restraint in other directions, so that he may use all his energy and ingenuity towards the improvement of the materials and his methods of production.

At the suggestion of the Motor Transport Corps, the Bureau of Standards, about a year ago, undertook an investigation to determine the most suitable conditions for such standard tests, and this conference was called to explain to those most interested the results of this work and to discuss proposals based on these results.

Dr. S. W. Stratton, Director of the Bureau, opened the meeting with a short address in which he dealt with the work of the Bureau in general and referred to the numerous occasions on which the Bureau has been able to assist the industries, by investigating problems of this nature, and by co-operating in the establishment of standards and the preparation of specifications.

Dr. H. C. Dickinson, Chief of the Automotive Power Plants Section, followed with some remarks covering the brake-lining investigation in particular and the results that were expected from it.

A full report and analysis of the work was then presented by the engineer in charge of the investigation, who concluded by submitting the Bureau's recommendations for the test as based on the results obtained.

A thorough discussion, during which the experience of many of those present was freely offered, followed and led to a very satisfactory agreement.

The interest of the brake-lining industry in this work was well shown by the large attendance and the thoroughness of the discussion. Many of those present expressed their appreciation of the assistance rendered by the Bureau and the hope that the Bureau, whose activities in the automotive field are only a recent development, would be able to cooperate with this industry to an increasing extent in the investigation of many important problems calling for consideration.

4. Natural Gas Appliance Investigation

The annual conference of the Natural Gas Association of America was held at Cincinnati, May 16 to 19 inclusive, and was attended by a representative of the Bureau. The Bureau of Standards has conducted

a very thorough investigation of the losses occurring in the use of natural gas and has prepared some information on this subject.

A conservative estimate places the monthly loss of gas at somewhere near 5,000 cubic feet for each consumer, because of improperly designed and poorly adjusted appliances, a total loss in domestic appliances alone of 1,500,000,000 cubic feet of gas each year.

The Bureau had an exhibit at the conference consisting of 11 burners in operation, illustrating correct and faulty methods of adjustment, the proper blue flame which indicates complete combustion and which will not blacken cooking utensils, and the proper distance between the burner and the top of the stove to get maximum efficiency from the gas. The exhibit created an unprecedented amount of interest and the Bureau's representative received many compliments upon it and upon the investigation which the Bureau had conducted.

It is planned to extend this work to cover the artificial gas industry as soon as possible.

5. Fire Tests of Building Partitions

As a part of the work of the fire-resistive properties of building materials, a series of tests is being conducted on brick walls. A test specimen in the shape of a panel 11 x 16 feet and 8½ inches thick is built into a heavy steel frame so that the whole can be swung into place in an oil-fired furnace of which the test panel then forms one wall. The panels are tested about one month or six weeks after completion, the test consisting in subjecting the panel to a severe fire during which the temperature of the furnace is increased in accordance with a predetermined program. The test is continued for 6 hours unless the panel fails in less time, and the temperatures reached at the end of the test are high enough to melt certain kinds of brick. Observations are made of the temperatures obtained at various parts in the brickwork and of the distortion of the panel caused by heating.

Observations as to whether temperatures on the cool side of the panel become high enough to ignite inflammable materials, whether cracks or other openings develop through which the fire might penetrate, etc., are an important feature. So far none of the brick walls tested failed to remain in place during the 6-hour test although as fire barriers the heavy

walls naturally proved superior. Several tests similar to those above described are being conducted each month. Engineers and architects or others interested in the details are welcome to visit the Bureau to witness the tests; the exact dates on which the furnace will be in operation may be obtained by correspondence.

6. Pyrometric Practice

Technologic Paper No. 170 "Pyrometric Practice", which has been referred to in previous numbers of this Bulletin, is now available. This publication has already been adopted as a standard text for teaching pyrometry in several universities. Copies may be purchased from the Superintendent of Documents, Government Printing Office, this city, at 60¢ per copy.

7. Simple Radio Receiving Sets

The radio laboratory of the Bureau of Standards is cooperating with the Bureau of Markets of the Department of Agriculture in the establishment of a system of broadcasting market reports by radio. Since this system has been started, a great many people previously not concerned with radio work have become interested in this subject, and it, therefore, seems important to secure all possible information regarding available radio apparatus which is suitable for receiving these reports.

The Bureau of Standards is enlisting the cooperation of manufacturers by asking them to write to it with a view of submitting for test such sets as they manufacture or which they may develop for the purpose mentioned above. It is likely that quite a market for such equipment will develop among farmers, shippers, chambers of commerce, radio clubs, and others who are interested in receiving directly radio market reports. As a result of the investigation now begun by the Bureau, it is hoped that specifications may be prepared covering the requirements as to behavior and usefulness which such sets should meet.

8. Research Work on Electro-deposition

During the past month a member of the Bureau's staff attended meetings of the American Electro-chemical Society in the interests of research work on electrodeposition. A great deal of interest was shown in the proposed program and plans were made for the formation of a division of the Society to be concerned wholly with this kind of work. If such a division is organized, it will be a distinct advantage in bringing together persons interested in this field and thereby

stimulating research work along electrochemical lines.

Letters have been sent out by the National Research Council to about 200 representative manufacturers in whose plants electroplating is an essential process. The purpose of these letters is to inquire whether they would be willing to furnish financial support toward research work on electrodeposition. If such support is received, it is expected that the funds will be expended for research work conducted at the Bureau of Standards under the general supervision of a representative advisory board.

9. Ruling Scale by Light Waves

It is interesting to note that it is now possible to construct scales for the measurement of length directly from the fundamental wave lengths of light without the use of any intermediary standard. As an example of work of this sort which is now being regularly carried out, it may be mentioned that the Bureau recently completed the rulings on a 6" scale using light waves from a tube containing Neon (wave length 5800 to 6600 A) as the length standard. The work was done for and the scale has been delivered to the Brown & Sharp Manufacturing Co.

10. Crystallization and Separation of Pure Dextrose or Glucose

It has been found recently that pure dextrose or glucose can be crystallized from its water solution and separated from the impurities by centrifugal machines in much the same manner as cane sugar. In controlling this crystallization, a knowledge of the solubilities of the pure substance in water is of fundamental importance. These solubilities have been determined at temperatures extending from 0°C to 90°C. At all temperatures below 50°C, the substance crystallizes with one molecule of water of crystallization, i.e., 9% water combined with the crystals, while above 50°C, the substance is anhydrous.

Dextrose is much less soluble than cane sugar and thus lends itself readily to this new process of crystallization; the solubilities are: At 23°C, 49.37%; at 30°C, 54.68%; at 50°C, 71.06%; at 65°C, 73.08%; at 80°C, 81.46%, and at 90°C, 85.0%.

11. Improved Method for the Determination of Total Sulphur in Rubber

An article under this title has been published in Rubber Age and Tire News, Vol. 9, page 49. It describes a method which is an improvement over previous methods for determining the total sulphur in rubber in that considerable time is saved; there is a saving of reagents, and more accurate results are

obtained by correcting for occlusion. The article was prepared jointly by M. Levin and S. Collier of the Chemistry Division of the Bureau.

12. Method for Differentiating and Estimating Unbleached Sulphide and Sulphate Pulps in Paper

Technologic Paper No. 189 bearing this title has just been issued and may be obtained from the Superintendent of Documents at 5¢ per copy. The purpose of this paper is to fill a need felt especially by paper chemists and analysts for a rapid and reliable method of distinguishing between and of making an approximately correct determination of mixtures of unbleached sulphide and sulphate pulps.

This paper gives briefly the basic differences in the manufacture of the two pulps and contains a concise review of the methods that have been recommended from time to time for distinguishing between them. It gives the procedure followed in developing a new and comparatively rapid method for distinguishing between these pulps and also gives some of the more important experiments carried out with various stains during this investigation. The method of preparing the new stain and the method of procedure for differentiating between unbleached sulphide and sulphate fibers is described in detail and tables showing the results of quantitative microscopical analysis of mixtures of these fibers stained by the new method are given.

13. Paper and Cotton Compared to Burlap for Sandbags

The results of a study which the Bureau has been conducting of paper and cotton bags for use as sandbag fortifications has been published in the Paper Trade Journal for May 19, 1921, under the title "Suitability of Paper and Cotton Bags in Relation to Burlap Bags for Sandbags". This work was undertaken for the War Department and the purpose of the investigation was to determine whether or not these materials could be used satisfactorily in sandbag fortifications or trenches.

The work included a large amount of laboratory testing and also experiments in service to find the value of this material when made up into bags. All tests in this investigation, with the exception of those on wet material, give results which indicate that a rope paper would be a very good substitute for burlap. This paper, however, is very weak when it becomes wet. If it could be waterproofed, this difficulty would be eliminated. However, at the present time the waterproofing of paper is only in the experimental stage. Many formulae for water-

proofing have been patented but when they are tried out in the paper mills it is found that they either do not waterproof at all or destroy the suitability of the paper for the purpose for which it is to be used. Practically all the work on waterproofing today has dealt only with the chemical treatment of the fiber either before or after the paper has been made, while very little has been done on the scientific control of beating processes in the manufacture of the paper.

The Bureau plans to investigate this problem thoroughly and by the use of chemicals combined with scientific control of the beating to manufacture, if possible, a paper similar to that mentioned above and yet waterproofed sufficiently to make it suitable in every respect for sandbags.

Since the paper just mentioned contains 30% manila and jute rope stock which might be hard to obtain in time of war, it is probable that the Bureau will also undertake to manufacture a 100% sulphate fiber paper that will be as strong as the above rope paper.

14. Aluminum Solders

All tests on recent aluminum solders have been completed and Circular 78 "Solders for Aluminum" will now be revised to include these tests. In spite of claims made by those interested, no solder for aluminum has yet been found which will withstand the corrosion test, although the fused zinc chloride solders withstand corrosion for the greatest length of time.

15. Tests of Brazed Copper Sheets Intended for Roofing Purposes

Recently the Library of Congress submitted for test some copper sheets for roofing purposes which had been joined by brazing. Two types of joints were used, a simple "lap" joint and a "lock" joint in which the edges of the two sheets to be joined were first bent double and then "locked" into one another.

The series of examinations indicated that of the two types of joints, designated as lap and lock, the lap joint is superior in strength and much more desirable in its structure. In forming the lock joint, apparently it is necessary to apply the heating torch for a considerably longer period in order to cause the metal to flow into the joint. In doing this, the upper fold of the sheet which forms the lock is highly heated and often burnt. It was noticed in most cases that none of the brazing metal penetrated directly below the upper fold so that the upper sheet

could easily be bent along the line of the junction. It appears from the results of this examination, that if the buckling of the sheets which apparently cannot be entirely prevented with this method of joining sheets, is not too objectionable, the lap joint should be satisfactory for the purpose. The lock joint is decidedly inferior in strength and other properties to the lap joint.

It may be pointed out that the joints should be carefully cleaned after brazing. In the specimens submitted, the film of zinc chloride remaining after cleaning the specimens was sufficient to accelerate atmospheric corrosion very decidedly within a very short time.

Respectfully,

S. W. STRATTON

Director
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